

REMARKS

By this amendment, Applicants have amended page 27, line 17; page 30, line 4; and page 32, line 6 to correct typographical errors. Applicants have also amended the claims to further and more clearly define their invention. In particular, claims 28 and 41 have been amended to conform the wording of the claims to the ratio "H/D." Claim 28 has been amended to recite that the microprojections have at least part of the surfaces coated with a molecular electroless plating catalyst layer. See, e.g., Figure 2(e) and page 14, line 23, to page 15, line 5 of Applicants' specification. Applicants have also added new claims 48 and 49 to define further aspects of the present invention. These claims are supported by, e.g., page 17, lines 1-9 of Applicants' specification. It is submitted at least claim 49 reads on and should be examined with the elected invention.

Claims 32 and 35-37 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,749,731 to Kobori et al. Applicants traverse this rejection and request reconsideration thereof.

The elected invention relates to a fine metal structure having its surface furnished with microprojections. The thickness or equivalent diameter of the microprojections ranges from 10 nanometers to 10 micrometers and the ratio of the height (H) to the equivalent diameter (D) of the microprojections H/D, is greater than 1. The microprojections are made of an alloy containing a nonmetallic element as an accessory constituent. Applicants have found that making the microprojections using an electroless plating method can provide microprojections free from defects and having a large aspect ratio only when using a molecular electroless plating

catalyst, instead of using a conventional colloidal catalyst, as the catalyst serving as a starting point of the electroless plating reaction. See, the paragraph bridging pages 16 and 17 of Applicants' specification, as well as Examples 1-4 at page 20, line 27 to page 32, line 23 of Applicants' specification. According to the present invention, the molecular electroless plating catalyst layer remains on at least a part of the surfaces of the microprojections. See, e.g., Figure 2(e) and the description at page 14, line 23 to page 15, line 5 of Applicants' specification.

The Kobori et al. patent discloses a gene detection chip and detection device. However, the Kobori et al. patent does not disclose that the pins of the detection chip have their surfaces coated with a molecular electroless plating catalyst layer, as presently claimed. In fact, since the Kobori et al. patent does not describe that the pins are made by electroless plating, it is submitted there would have been no reason to have the surfaces of the pins coated with a molecular electroless plating catalyst layer. Accordingly, the presently claimed invention is neither disclosed by nor obvious over Kobori et al.

Claims 28-30, 32-35, 37, 45 and 46 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,342,737 to Georger, Jr., et al. Applicants traverse this rejection and request reconsideration thereof.

The Georger, Jr., et al. patent discloses that high aspect ratio metal microstructures may be prepared by a method involving

- (i) forming a layer of a photoresist on a substrate;
- (ii) exposing the layer to actinic radiation in an imagewise manner and developing the exposed layer to obtain a surface which contains regions having no remaining photoresist and regions covered with photoresist;

(iii) metallizing the surface to form a layer of metal on the region of the surface having no remaining photoresist and on the sides of the regions of photoresist remaining on the surface; and

(iv) optionally, stripping the photoresist remaining on the surface. Such microstructures are useful as electron emitters, anisotropic high dielectric interconnects, masks for x-ray photolithography, carriers for the controlled release of active agents, and ultramicroelectrode arrays.

The Georger, Jr. et al. patent discloses that the metallizing step may be carried out using conventional materials and techniques. See, e.g., column 10, line 26 et seq. of Georger, Jr. et al. While the examples include the use of a nickel-boron plating bath, the undersigned has been advised that the catalyst used is not a molecular electroless plating catalyst as is used in the present invention, but a conventional colloidal catalyst. As described at page 17, lines 1-10 of Applicants' specification, Applicants have found that only when using a molecular electroless plating catalyst, instead of using a conventional colloidal catalyst, as the catalyst serving as a starting point of the electroless plating reaction, is it possible to fill the cavity free of defects and to produce a fine metal structure of large aspect ratio with high precision. As noted in Examples 1-4 at page 20, line 27 to page 32, line 23 of Applicants' specification, when a molecular electroless plating catalyst is used, the microprojections do not have flaws such as seams or voids. On the other hand, as noted in the comparative examples within Examples 1-4, when a colloidal electroless plating catalyst was used in place of the molecular electroless plating catalyst, imperfections were observed in the microprojections. Thus, Applicants have shown that a flawless fine metal structure can be produced only when a molecular electroless plating catalyst is applied.

The molecular electroless plating catalyst is retained on at least part of the surfaces of the microprojections after formation of the fine metal structure. Thus, not only are the microprojections of the present invention free of defects, but the microprojections differ from the microprojections in Georger, Jr. et al. by having their surfaces at least partially coated with a molecular electroless plating catalyst layer. Such is neither disclosed nor suggested by Georger, Jr. et al.

In view of the foregoing remarks, it is submitted presently claimed invention is patentable over Georger, Jr. et al.

Claims 28-37 and 45-47 stand rejected under 35 U.S.C. 102(a) as being unpatentable over Georger, Jr. et al. in view of U.S. Patent No. 6,916,614 to Takenaka et al. or Kobori et al. Applicants traverse this rejection and request reconsideration thereof.

The deficiencies of Georger, Jr. et al. are noted above. It is submitted neither Takenaka et al. nor Kobori et al. would have remedied the deficiencies of Georger, Jr. et al. since neither would have provided any reason to provide at least part of the surfaces of microprojections with a molecular electroless plating catalyst layer. Accordingly, the presently claimed invention is patentable over the proposed combination of Georger, Jr. et al., Takenaka or Kobori et al.

In view of the foregoing amendments and remarks, favorable reconsideration and allowance of all claims presently in the application are respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Antonelli,

Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Docket No. 500.46239X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

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